European Environment Agency

Country profile – United Kingdom

The section 'Key climate- and energy-related data' was prepared by the EEA. It includes the latest data available as of 31 July 2014

The section 'Climate and energy policy framework' was prepared by eclareon and Ecologic Institute, Germany. It includes the latest information on national policies and measures available as of 31 May 2014.

For methodological details and other country profiles, see www.eea.europa.eu/themes/climate/country-profiles.

Key climate- and energy-related data — United Kingdom

Key data on GHG emissions	2005	2011	2012	2013	EU 2012
Total GHG emissions (UNFCCC, Kyoto Protocol) (Mt CO_2-eq.)	674.7	562.8	580.8	570.3	4 544.2
GHG per capita (t CO_2-eq./cap.)	11.2	8.9	9.1	8.9	9.0
GHG per GDP (g CO_2-eq./PPS in EUR)	402	340	342	328	350
Share of GHG emissions in total EU-28 emissions (%)	13.0 %	12.2 %	12.8 %	12.8 %	100 %
EU ETS verified emissions (Mt CO2-eq.)	242.5	220.9	231.3	225.5	1 848.6
Share of EU ETS emissions in total emissions (%)	36 %	39 %	40 %	40 %	41 %
ETS emissions vs allowances (free, auctioned, sold) (%)	+ 17.7 %	– 13.0 %	– 9.6 %	+ 30.0 %	– 14.1 %
Share of CERs & ERUs in surrendered allowances (%)	0.0 %	7.2 %	19.0 %	n.a.	26.4 %
Non-ETS (ESD) emissions, adjusted to 2013–2020 scope (Mt CO2-eq.)	400.4	340.0	347.8	343.3	2 566.6
Key data on renewable energy	**2005**	**2010**	**2011**	**2012**	**EU 2012**
Share of renewable energy in gross FEC (%)			3.8 %	4.2 %	14.1 %
() = including all biofuels consumed in transport	(1.4 %)	(3.3 %)			
Share of renewable energy for electricity (%)	4.1 %	7.4 %	8.8 %	10.8 %	23.5 %
Share of renewable energy for heating and cooling (%)	0.8 %	1.7 %	2.3 %	2.3 %	15.6 %
Share of renewable energy for transport (%)			2.7 %	3.7 %	5.1 %
() = including all biofuels consumed (%)	(0.3 %)	(3.1 %)			
Key data on energy consumption	**2005**	**2010**	**2011**	**2012**	**EU 2012**
Primary energy consumption (Mtoe)	222.8	203.0	189.7	195.4	1 584.8
Primary energy consumption per capita (Mtoe/cap.)	3.7	3.2	3.0	3.1	3.1
Final energy consumption (Mtoe)	152.8	141.3	130.9	134.0	1 104.5
Final energy consumption per capita (Mtoe/cap.)	2.5	2.3	2.1	2.1	2.2
Efficiency of conventional thermal electricity and heat production (%)	44.3 %	45.8 %	45.1 %	42.8 %	50.0 %
Energy consumption per dwelling by end use	**2005**	**2009**	**2010**	**2011**	**EU 2011**
Total energy consumption per dwelling (toe/dwelling)	2.01	1.69	1.75	1.56	1.42
Space heating and cooling (toe/dwelling)	1.36	1.10	1.17	0.98	0.96
Water heating (toe/dwelling)	0.31	0.27	0.27	0.27	0.18
Cooking (toe/dwelling)	0.05	0.04	0.04	0.04	0.08
Electricity (lighting, appliances) (toe/dwelling)	0.29	0.27	0.27	0.27	0.20

Progress towards GHG targets (under the Effort Sharing Decision, i.e. non-ETS emissions)

2013 ESD target (% vs base year)	– 7.9 %	2020 ESD target (% vs base year)	– 16.0 %
2013 ESD emissions (% vs base year)	– 9.3 %	2020 ESD projections WEM (% vs base year)	– 19.4 %
		2020 ESD projections WAM (% vs base year)	n.a.

Based on approximated emission estimates for 2013, emissions covered by the Effort Sharing Decision (ESD) (i.e. in the sectors which are not covered by the EU ETS) are expected to be below the annual ESD target in 2013. Projections also indicate that 2020 ESD emissions are expected to be below the 2020 ESD target, with the current existing measures.

Progress towards renewable energy targets

2012 RES share in gross final energy consumption (%)	4.2 %	2011–2012 indicative share from RES Directive (%)	4.0 %
2020 RES target	15.0 %	2012 expected share from NREAP (%)	4.0 %

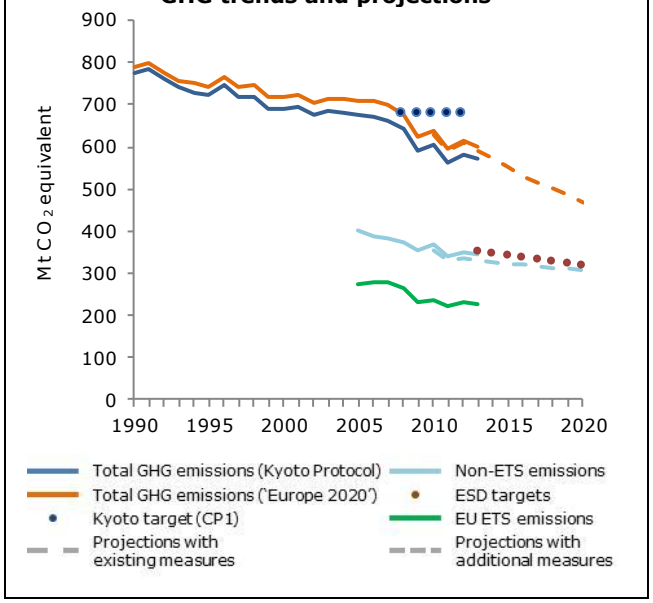
The average share of renewable sources in gross final energy consumption for 2011–2012 was 4.0% (5.3 Mtoe), which is equal to the indicative RED target for 2011–2012 (4.0%). At the same time, the share of renewables in 2012 (4.2 %) is higher than the expected 2012 NREAP target (4.0 %). Over the period 2005–2012 the observed average annual growth rate in renewable energy consumption amounted to 15.9%. In order to reach its 2020 NREAP target, United Kingdom needs an average annual growth rate of 17.6% in the run-up to 2020. In absolute terms, this is equivalent to 4.1 times its cumulative effort so far.

Progress towards energy efficiency targets

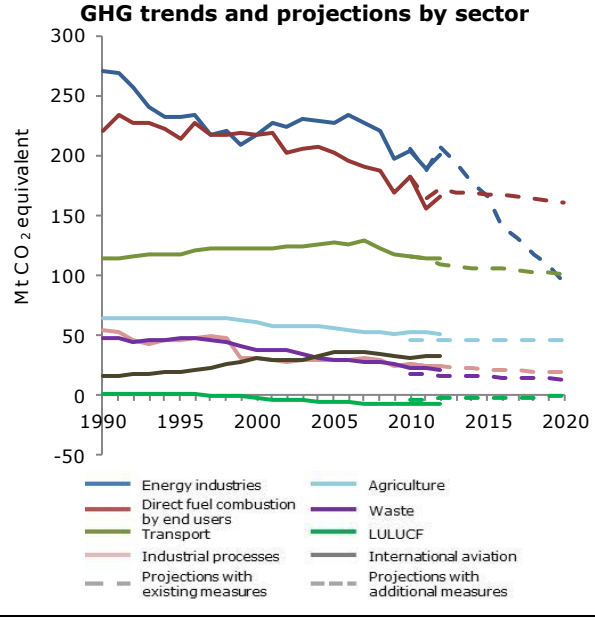
Primary energy consumption:		Final energy consumption:	
2005–2012 average annual change	-1.9 %	2005–2012 average annual change	-1.9 %
2012–2020 average annual change to target	-1.2 %	2012–2020 average annual change to target	2.1 %

Between 2005 and 2012, energy consumption decreased by more than 12 %, at a faster pace than is necessary to meet the 2020 targets. This was a combined result of energy efficiency policies, such as the Energy Company Obligation Scheme and the financial incentives available to the residential and public sector for energy efficiency improvements, and the effects of the economic crisis. Improving the efficiency in electricity conversion, which has been decreasing in recent years due to a 30 % increase in consumption of solid fuels, could help further reducing primary energy consumption.

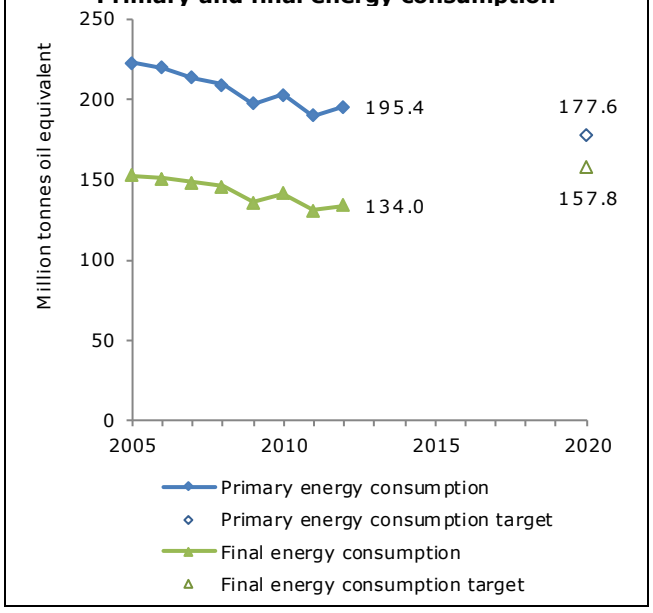
GHG trends and projections



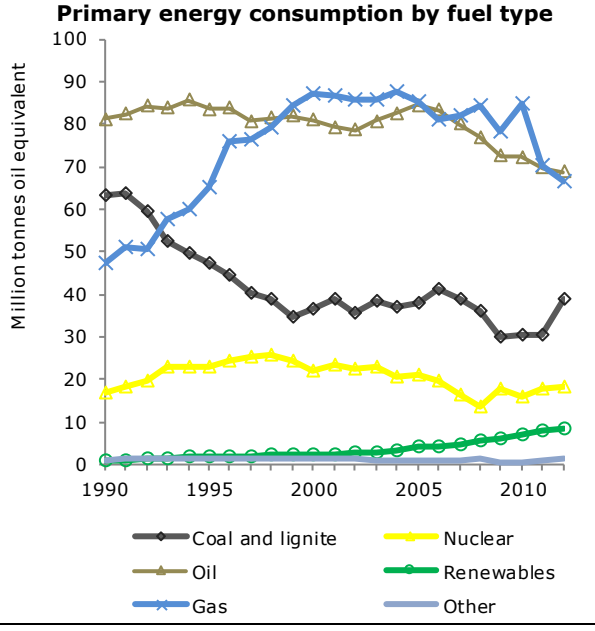
GHG trends and projections by sector



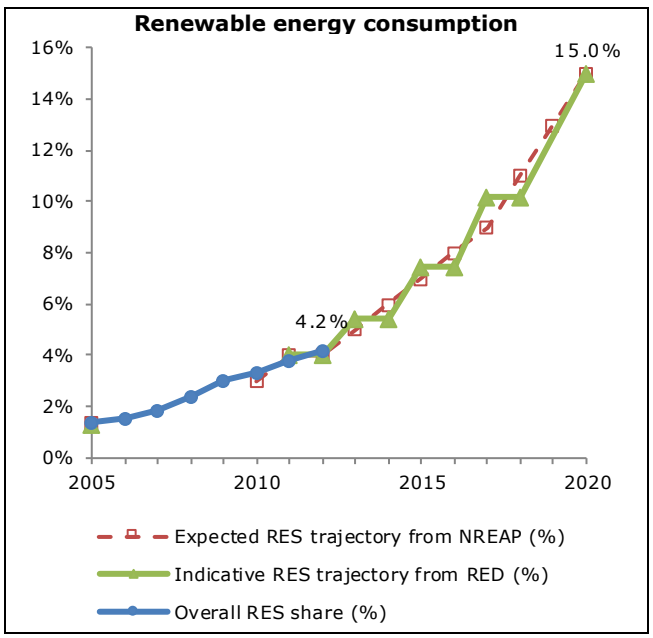
Primary and final energy consumption



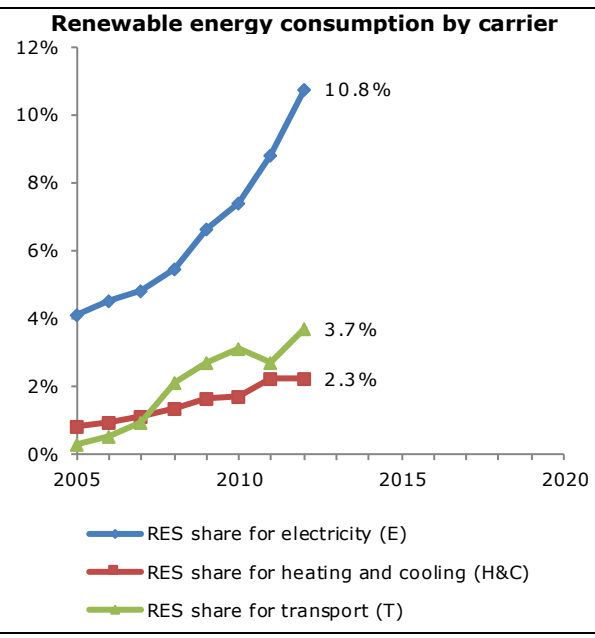
Primary energy consumption by fuel type



Renewable energy consumption



Renewable energy consumption by carrier



Climate and energy policy framework

Challenges and opportunities
The United Kingdom (UK) was the first country worldwide to establish a long-term, legally binding emission reduction target for 2050, and now has a wide range of climate change policy instruments in place. However, the landscape of frequently changing and often overlapping instruments is partly inefficient, and the UK is currently not on track to meet its own 2050 target (UK CCC, 2014).
The UK is still far from reaching its 2020 target for renewable energy of 15 %, despite the broad range of policy instruments in place. However, renewable electricity, if successfully promoted, could save the UK up to GBP 160 billion (approximately EUR 195 billion) in energy supply costs to 2050, contribute up to GBP 89 billion (approximately EUR 109.2 billion) to the UK economy and potentially support over 35 000 jobs (DECC, 2013a). The uptake of renewable heat is also very low and some financial and non-financial barriers are still to be eliminated (UK CCC, 2014). Another challenge remains energy efficiency in the residential sector, but there is also scope in the service and industrial sectors, where currently barriers are less well addressed (DECC, 2012b). Setting strict standards for energy efficiency and tightening obligations for energy suppliers could provide significant opportunities. Studies suggest that the UK has the potential to save 196 TWh in 2020, which is 11 % below business-as-usual scenarios. The related job and revenues potential is high, given that already in 2010/2011 the sector accounted for around 136 000 jobs and revenues of GBP 17.6 billion (approximately EUR 21.6 billion) (DECC, 2012a).
The complex and frequently changing policy landscape has resulted in confusion about available incentives and planning requirements, thus significantly delaying necessary investment decisions in renewable energy and energy efficiency (DECC, 2012b; EREC, 2013). The adoption of the Energy Act in late 2013, including the Electricity Market Reform (EMR), gives hope for more political certainty for investment, but the details of its implementing legislation are still to be decided.

Climate and energy strategies
The 2008 Climate Change Act provides the legal framework for climate policy in the UK and establishes a binding climate target of emission reductions by at least 80 % by 2050 (from the 1990 baseline). Regular 5-year carbon budgets serve as interim targets. An independent Committee on Climate Change advises the government on the emission target, carbon budgets and reports on the progress. Within this overall framework, the UK is implementing a broad set of different climate policy measures that are often adjusted and partially overlap. Much of this policy landscape is being altered by the Energy Act (December 2013), which establishes 'a legislative framework for delivering secure, affordable and low carbon energy' and includes a wide range of measures. Inter alia, the Act enables the Secretary of State to set a 2030 decarbonisation target range for the electricity sector in 2016, and introduces an EMR. For its future energy mix, the UK focuses on renewable energy, the use of nuclear energy, carbon capture and storage (CCS), and unconventional natural gas.

Renewable energy
Renewables still makes up only a minor share of energy consumption in the UK. Policy uncertainty and frequent changes are often named as the main barriers for further development. The 2011 Renewables Energy Roadmap (last updated in December 2013) sets out the plan for accelerating the deployment and use of renewable energy. Specific programmes and strategies are also in place for particular renewable technologies. Additionally, the devolved administrations (Northern Ireland, Scotland, Wales) have set themselves ambitious 2020 targets for both renewable electricity and heat consumption, and have established their own strategies. The recently passed UK Energy Act provides a new framework for electricity generation from 2014 onwards, and aims to provide more stability, but the specifics are still to be discussed. Currently, the principal instrument for the promotion of **large-scale renewable electricity** is the Renewables Obligation, a quota system introduced in 2002, which requires licensed electricity suppliers to source a proportion of their electricity from eligible renewable sources. The new Energy Act aims to replace this system with feed-in tariffs (FITs) with Contracts for Difference (CfD), for renewables, CCS and nuclear electricity. The first CfDs were already awarded in April 2014 (DECC, 2014b). **Small-scale plants** up to 5 MW can benefit since 2010 from FITs, and it is envisaged that this scheme will be extended to community projects of up to 10 MW. **Renewable heat** is promoted through the Non-domestic Renewable Heat Incentive (RHI), launched in 2011, and the Domestic RHI, launched in 2014. While under the Non-domestic RHI generators of renewable heat for non-domestic buildings are eligible for a fixed tariff for a 20-year period, Domestic RHI guarantees domestic consumers quarterly payments for 7 years. The RHI schemes aim at increasing the share of renewable heat to 12 % by 2020. However, to date, the uptake of RHI has been quite slow and some financial and non-financial barriers still have to be removed (UK CCC, 2014).

Energy networks
The UK needs to upgrade and make its electricity grids more flexible to sufficiently integrate renewable energy, requiring an investment of GBP 19 billion (approximately EUR 23.32 billion) by 2020 (OFGEM, 2010). The government works together with stakeholders in the Electricity Network Strategy Group to address this challenge and to monitor the progress of major electricity transmission projects. The EMR significantly alters the electricity market framework, and it is still open whether it will send the right signals, depending on its concrete implementation. In 2014, the Smart Grid Forum, with representatives from electricity network companies, consumer groups, energy suppliers and wider industry, published its Smart Grid Vision and Routemap that outlines upcoming challenges for electricity distribution network operators.

Energy efficiency
The Energy Efficiency Strategy, updated in 2013, identified main barriers for energy efficiency in the UK — including embryonic markets, information gaps, misaligned financial incentives and undervaluing energy efficiency — and introducing a range of specific measures. The updated Strategy recognises that energy efficiency in the residential, commercial and industrial sectors is already covered by existing instruments, however there still is room for improvement, as there is a great deal of untapped cost-effective potential in the UK (DECC, 2013b). The implicit **tax rate** on energy is already high compared to other EU Member States, and only few exemptions are granted. **Cogeneration** is promoted under the 2012 strategic framework for low-carbon heat and can receive support under

the Climate Change Levy Exemption, Enhanced Capital Allowances scheme, Renewables Obligation, Renewables Heat Incentive or the FIT. Energy efficiency for **large public and private sector organisations** (consuming more than 6 000 MWh) is promoted through the CRC Energy Efficiency Scheme (or CRC Scheme), targeting emissions not already covered by Climate Change Agreements (CCAs) and the EU Emissions Trading System (ETS). Participants are required to annually surrender allowances to offset their emissions. Under the Enhanced Capital Allowance scheme, businesses can write off costs for energy- and water-saving plants and machinery. Additionally, **energy-intensive businesses** with CCAs are allowed to receive up to a 90 % discount from the UK Climate Change Levy when meeting energy efficiency or emission reduction targets, as set out in the Agreements. The UK also plans to introduce a new Energy Savings Opportunity Scheme for companies in 2014, and to pilot an Electricity Demand Reduction providing financial incentive through the Capacity Market for energy-saving measures (DECC, 2014c). Energy efficiency in **households** is mainly promoted through the 2013 Energy Companies Obligation, which requires larger energy suppliers to deliver energy efficiency measures to domestic energy users, with a particular focus on low-income households. The scheme is complemented by the Green Deal, operational since 2013, that encourages the uptake of energy-saving technologies (power generation, insulation, energy-saving devices) in commercial and residential buildings. It allows consumers to pay back the costs of improvements through their energy bills. The uptake of the scheme was low at the start but recent amendments to the scheme, including higher cash-back rates, might remove existing barriers (DECC, 2014a).

Transport

Although emissions from transport in the UK have been decreasing since 2007, they still account for a fifth of the UK's greenhouse gas (GHG) emissions, 92 % of these resulting from road transport. The UK's approach mainly focuses on promoting **low-emission vehicles**. In 2013, the UK published a Strategy for Ultra-low Emission Vehicles with the aim to effectively decarbonise the fleet by 2050, and committing to funding of GBP 500 million (approximately EUR 613.5 million) from 2015 until 2020. Simultaneously, the UK government and industry published a Strategy for Growth and Sustainability in the UK Automotive Sector setting a pathway for research and commercialisation of low-carbon technologies. The UK does not levy a registration **tax** on passenger cars but a carbon dioxide (CO_2)-based ownership tax with higher rates applying in the first year for high-emitting vehicles (ACEA, 2012). Diesel and petrol are taxed above EU average at equal rates, but rates have not been increasing for years. **Renewable energies in transport** are promoted through the Renewable Transport Fuel Obligation, which obliges fossil fuel suppliers to prove that a percentage of fuels supplied comes from renewable sources and is sustainable. There is, however, no encompassing **modal shift** strategy in place apart from the recently published Door to Door Strategy (March 2013) that aims to better integrate between different modes of sustainable passenger transport. There is no climate-related modal shift strategy for freight transport. The railway network in the UK is privatised but the UK committed to invest more than GBP 16 billion (approximately EUR 19.6 billion) between 2014 and 2019 in the existing rail network, high-speed train connection, a new fleet of energy-efficient intercity trains, and rail electrification.

Agriculture

The UK government and devolved administrations have taken various approaches to emissions from agriculture. In England, the 2011 Agriculture Sector Greenhouse Gas Action Plan is a voluntary, industry-led plan to reduce emissions by 2020 by 3 Mt CO_2 equivalent. Scotland informs farmers through a website on sustainable farming techniques. The 2009 established Welsh Land Use Climate Change Group published its report in 2013 on ways to reduce emissions from agriculture and land-use change until 2050. Northern Ireland, where agriculture is the largest source of emissions (28 %), published in 2011 its Efficient Farming Cuts GHG strategy, a joint initiative of the government, the agri-food industry and environmental stakeholders. In England, the new environmental land management scheme will, from 2016 onwards, provide financing to farmers and land managers, delivering benefits for wildlife, improving water quality and creating woodland.

Waste

The UK aims to move to a zero-waste economy. Since 1996, the UK levies a Landfill Tax to reduce waste production and to encourage recycling as well as the reduction of methane from biodegradable waste. The standard rate has since been gradually increasing from GBP 7 to 80 (approximately EUR 8 to 98) per tonne. A number of voluntary agreements between government and businesses on waste reduction and improved package design exist. England adopted a Waste Prevention Programme in 2013, committing to develop a new Sustainable Electrical Action Plan and Fund supporting local authorities, businesses and civil society organisations in waste prevention. Northern Ireland revised its Waste Strategy in 2013, placing increased emphasis on resource efficiency, and Scotland recently adopted a Blueprint for a more Resource Efficient and Circular Economy aiming to cut total waste from households and businesses by 7 % by 2017 and by 15 % by 2025. Wales follows its strategy Towards Zero Waste, to reduce waste by 27 % and recycle 70 % by 2025.

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